

FINAL PROJECT REPORT
BERTHA MILL SITE RECLAMATION PROJECT
MONT A/E 87-46-108

STATE DOCUMENTS COLLECTION

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DEPARTMENT OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU
HELENA, MONTANA

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BY

DELTA ENGINEERING, P.C.

P. O. BOX 1481

GREAT FALLS, MT 59403

AUGUST 1988

I. INTRODUCTION

The Bertha Mill Site is located approximately three miles west of Jefferson City, Jefferson County, Montana. The main mill site was located in the SE1/4 Sec.3, T7N, R4W, and was divided into the Upper Mill Site and Lower Mill Site. Three minor sites, North Shaft, North Pit, and Northeast Shaft, are located less than one-half mile north of the main site. See the As-Built Construction Drawings in the Appendix for location and site plans. A gravelled public road is located along the north side of the main site and provided direct access to the project.

The surrounding area consists of moderate to steep hillsides vegetated with native grasses such as rough fescue, Idaho fescue, and bluebunch wheatgrass. Stands of pine and quaking aspen are also scattered on and near the site. Elevations range from 5200 feet above MSL at the site to over 6200 feet above MSL less than one mile from the site. The main site lies in a narrow creek bottom with an unnamed tributary to Spring Creek flowing adjacent to and through the disturbed areas. Outcroppings of fractured granite are located along the drainage bottom. The predominant land use is livestock grazing.

Most of the project site consists of patented mining claims currently owned by Mr. and Mrs. Robert Ebert, Glenore Mines, and First Trust Montana (Bar Ed Ranch). Property other than mining claims is owned by First Trust Montana. The area is sparsely populated; the closest residents live at Corbin, a townsite one mile east of the site.

The area of disturbance included in this project was 25 acres which was spread over a 150 acre area. Several mining disturbances

adjacent to the project site were not reclaimed because of landowners unwillingness to allow reclamation.

The Bertha Mill Site includes the Bertha Mine which began operation about 1905. The main shaft was extended to a depth of over 900 feet. Over 16,000 feet of underground workings were developed. Ore mined at this site included gold, silver, copper, and lead. Fire destroyed the flotation plant and gravity concentrator in 1917, therefore closing the mine. Plans have been made to resume mining several times since closure, but little actual work has been completed.

Environmental impacts and safety hazards were of little concern in the early days of mining in Montana. The abandoned ruins and unsightly waste piles at the site were an invitation for people to discard trash, rubbish, and car bodies at the site. This was evident at this site as could be seen by the following items and mine disturbances:

Upper Bertha Mill Site and Lower Bertha Mill Site

- Two collapsed shafts and one collapsed adit
- Timber remnants of mine structure
- Concrete foundations
- Approximately 15 acres of barren mine and mill tailings with very steep slopes
- Tailings deposited on the banks of an unnamed tributary to Spring Creek
- Acid mine drainage seep
- Trash, lumber, abandoned car bodies, and abandoned household appliances
- Exploration pits

North Pit

- Exploration pit
- Pile of mine waste deposited on the bank of a spring fed drainage

North Shaft

- Collapsed shaft
- Approximately two acres of barren mine tailings
- Concrete and stone foundations

Northeast Shaft

- Collapsed adit and collapsed shaft
- Approximately one acre of barren mine tailings and cinders
- Concrete and stone foundations
- Deteriorated wooden buildings

These items and situations listed above created the following problems at the site:

- Mine openings posing a threat to people, livestock, and wildlife
- Concrete foundations and deteriorated timber structures that would invite passersby to these hazards
- Barren tailings susceptible to wind and water erosion
- Tailings deposited on the banks of the unnamed tributary to Spring Creek continually being eroded, especially during high flows, and thus polluting downstream waters
- Acid mine drainage that surfaced and prohibited vegetation from becoming established
- Creation of a dump site for trash, garbage, and numerous large debris
- Unsightly area that was aesthetically unpleasing
- Denuded areas/absence of vegetation

The project objectives were to reclaim the site and eliminate or mitigate the given problems, within financial and practical limits, using proven reclamation technology and techniques. Specific objectives of this reclamation project include:

1. Backfill exploration pits and collapsed adits
2. Secure collapsed shafts with concrete shaft covers and chain link fence
3. Provide permanent access onto the main site
4. Bury concrete and timber ruins and miscellaneous mine debris on site
5. Collect acid mine drainage and discharge to the stream at a "point" location
6. Construct drainage ditches through and around reclaimed areas to control runoff and protect reclaimed areas
7. Regrade tailings to blend with adjacent topography
8. Establish natural vegetation to stabilize disturbed areas
9. Improve the overall aesthetics by removing visible impacts of past mining

A 52-inch CMP culvert was installed at Corbin, one mile east of the Bertha Mill Site. The culvert was installed in the unnamed tributary to Spring Creek so that the road leading to the Bertha Mill site could be rerouted around homes at Corbin. Jefferson



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<https://archive.org/details/berthamillsitere1988delt>

County supplied the culvert and the contractor installed the culvert under a change order to the contract.

Color slides included with this report show the abandoned site prior to reclamation, the site during various phases of reclamation, and the site immediately after completion of reclamation.

II. DESCRIPTION OF RECLAMATION CONTRACT

A. Dates of Contract Schedule

Bid Date: December 10, 1987

Low Bidders:	1. Mountain Construction Helena, Montana Bid - \$166,944.58
	2. Swan and Sons Construction, Inc. Anaconda, Montana Bid - \$182,000.10
	3. West Valley Construction Co., Inc. Anaconda, Montana Bid - \$186,550.35

Contractor Award Date: December 16, 1987

Notice to Proceed Date: January 11, 1988

Preconstruction Meeting Date: January 12, 1988

Start-up Date: February 15, 1988

Completion Date: June 17, 1988

"Weather" (No work) Days: 15 Days

DSL Supervisor Ben Mundie

Consulting Engineer: Delta Engineering P.C.
Great Falls, Montana

Project Engineer: Craig Nowak

Project Inspector: Dave Anderson

B. List of Equipment Used on the Project

<u>Equipment Description</u>	<u>No. of Units</u>
Caterpillar D8 dozer	1
Hitachi 083 track backhoe	1
Terex scraper - 20 C.Y.	1
Caterpillar scraper - 20 C.Y.	1
Caterpillar grader	1
John Deere farm tractor	2
Custom-made grass seed drill	1
Caterpillar D4 crawler tractor	1
Lime/fertilizer spreader	1
Mulch spreader	1
Bobcat post pounder	1
4-wheel ATV	1
2-ton trucks	2
3-point hitch mounted crimper	1
Miscellaneous power tools (chainsaws, etc.)	

C. Narrative of Construction Methods

The Bertha Mill Site was similar to many abandoned hard-rock mines such that mine/mill tailings were located in and near natural water courses. The tailings forming the south bank of the stream were very steep. This restricted standard equipment operating techniques in recontouring the tailings because stream quality had to be preserved. One of the mine claim owners, Glenore Mines, requested that the "flat area" at the Upper Site be maximized to allow for a future mining operation. This would create steep grades (2:1 slopes) adjacent to the stream. However, this request was honored in exchange for the landowner's consent to allow reclamation. The three other sites were located on hillsides where the biggest concern was access.

Upper Bertha Mill Site and Lower Bertha Mill Site

Two permanent stream crossings were constructed at the main site to provide direct access as per the landowner's (Glenore Mines) request. Each stream crossing consisted of two 24 inch corrugated polyethylene (CPE) culverts and a 20 foot wide, graveled surface

road. Concrete, timbers, trash, abandoned car bodies, and miscellaneous mining debris were all buried on site.

The tailings were recontoured and shaped to blend with the surrounding topography. Recontouring included hauling 16,800 cubic yards from the lower site to the upper site. A scraper was used to haul tailings and a dozer was used to shape the tailings and construct the final contours. The contractor was very conscientious about minimizing the disturbance to the existing landscape and vegetation. At one location, a backhoe was used to load the scraper in lieu of removing several large quaking aspen trees to provide better access.

A 400 cubic yard "pocket of slime" was discovered at the lower site during construction. This material could not support equipment and was very difficult to handle. This material was spread out and covered with tailings.

An attempt was made to open the two existing collapsed shafts at the upper site at the request of Glenore Mines. The contractor made a diligent effort in excavating downward to an approximate depth of 30 feet without locating either open shaft. It was decided to backfill each excavation and place the concrete shaft cover as originally planned. A chain link fence was constructed around each shaft cover for additional security.

Four hundred feet of the stream was reshaped at the lower site and lined with PVC and rip rap. Three drainage ditches totalling 1015 feet were constructed at specific locations to intercept and control surface drainage over the reclaimed tailings. These ditches were also lined with PVC and rip rap.

Long, steep slopes were required at the upper site to maximize the area available for future mining operations. This necessitated contour ditches on the slopes to intercept surface runoff and prevent erosion. Four contour ditches totaling 1515 feet were constructed to direct runoff to the nearby stream. These contour ditches proved effective before the project was completed.

A seepage collector was constructed at an apparent acid mine drainage seep. The seep area was dry during construction, but it was still excavated. The seep was located below the ground surface and the seepage collector installed accordingly. The seepage collector was drained to the adjacent stream with approximately 50 feet of four inch PVC pipe. Flow from the collector was estimated at 1 gpm after construction.

Lime was applied to the surface of the tailings with a hydraulically driven lime spreader pulled with a crawler tractor. This equipment arrangement proved very effective considering the steep terrain. The tractor could negotiate the moderate slopes and could also back the spreader to specific locations and broadcast the lime downward, over very steep slopes. Lime was supplied by Montana Limestone Company from a quarry at Warren, Montana.

Topsoil was placed on all disturbed areas to a depth of eight inches. Approximately 9400 cubic yards of topsoil were obtained from on-site sources and 6200 cubic yards were imported from nearby off-site sources. Spreading the topsoil on the steep 2:1 slopes at the upper site was difficult especially with the contour ditches. Topsoil was stockpiled at the top of the slope and drifted downslope with a dozer. This procedure destroyed the contour ditches requiring reconstruction. This problem can be avoided in future

projects by constructing terraces instead of ditches which would provide access for equipment.

Fertilizer was supplied by Agri Feeds and Fertilizer from Helena and spread with the same implement used to spread lime. Seed was supplied by Treasure State Seed from Fairfield and was planted with a custom-made, four-wheel drive, articulated drill in most locations. The steepest slopes were hand broadcasted.

Most of the reseeded area was mulched with grass hay provided by Middle Creek Farms from Bozeman. Mulch was embedded in the soil with a 3-point mounted crimper specifically made for this purpose. This crimper proved very effective. The 2:1 slopes, with the contour ditches, at the upper site were mulched with curlex blanket manufactured by American Excelsior Company. The contractor encountered some difficulties with initial placement and layout of the curlex blanket but experience quickly improved efficiency. The curlex or "erosion control" blanket proved effective and worthwhile even before the project was completed. A very intense rainstorm occurred in late May with no erosion damage on the blanketed slopes.

A three wire fence was constructed around the reclaimed site by Triple A Fencing. Four gates were installed in the fence.

Liming, fertilizing, seeding, and hay mulching services were provided by Western Reclamation from Bozeman.

North Shaft

Access to this site was provided by grading a new road and upgrading an existing trail. The deteriorated buildings and foundations at the North Shaft were buried under the on-site mine waste. Mine waste was graded to blend with adjacent contours. A concrete cover was placed over the collapsed shaft. The shaft cover

was placed below the ground surface and covered with mine waste. Reclamation removed visible evidence of the shaft and shaft cover.

Topsoil was obtained at an off-site source near the main site and applied to a depth of eight inches. Lime, fertilizer, and seed were applied with the same methods used at the Upper and Lower Bertha Mill Sites. Grass hay mulch was also applied and crimped using the same procedures. A three wire fence including one gate was installed around the reclaimed site. The access road was regraded to conform to the natural topography and reseeded.

North Pit

An existing trail was graded to provide access to the North Pit. The North Pit consisted of two exploration pits and a pile of mine waste. Reclamation consisted of backfilling the pits with the mine waste and matching the natural topography. The contractor was very careful in minimizing surface damage when regrading the mine waste.

Topsoil was obtained at an off-site source near the main site and spread to a depth of eight inches over the mine waste. Lime, fertilizer, seed, and hay mulch were applied with the same methods used at the Upper and Lower Bertha Mill Sites. A three wire fence and gate were installed around the main site. The access road was regraded to natural topography and reseeded after site reclamation.

Northeast Shaft

An existing trail was graded to provide access to the Northeast Shaft. The deteriorated buildings and foundations were buried under the on-site mine waste. Mine waste was graded to blend with the natural topography. The collapsed shaft was sealed with a concrete cover which was placed below the ground surface and covered

with mine waste. There is no evidence of the shaft cover as a result of reclamation. A mine adit was discovered on the east edge of the site in the mine waste during excavation. There was no discharge during construction, but a mine drain was installed. The drain consisted of 10 feet of 4 inch perforated PVC and 40 feet of 4 inch solid PVC. The drain daylighted at an adjacent drainage.

Topsoil was borrowed at an off-site source near the main site and spread to a depth of eight inches over the mine waste. Lime, fertilizer, seed, and hay mulch were applied with the same methods used at the Upper and Lower Bertha Mill Sites. A three wire fence including one gate was installed around the reclaimed site. The access road was regraded to conform to the natural topography and reseeded after site reclamation.

III. COST SUMMARY

A. Itemized Construction Costs

This contract was divided into four parts to correspond with the four sites but only one contract was awarded. Unit prices were bid for most construction items but lump sum bids were more practical for other items. Estimated quantities and estimated unit costs are given for lump sum items where possible. Quantities, either actual or estimated, and unit costs for construction items at each site are given below. A summary of the change orders is also given.

UPPER BERTHA MILL SITE AND LOWER BERTHA MILL SITE

Item	Quantity	Bid Price	Total Cost
Access Roads	262 LF (A)	\$ 10.85/LF	\$ 2,842.70
24" CPE Culvert	400 LF (A)	8.00/LF	7,200.00
Regrade Tailings	19,500 CY (E)	17,280.00 LS	17,280.00
Excavate and Haul Tailings	16,841 CY (A)	0.85/CY	14,314.85
Debris Disposal	L.S.	8,200.00	8,200.00
Shaft Closure with Fence	2 EA (A)	3,167.80 EA	6,335.60
Contour Ditches	1515 LF (A)	3.53/LF	5,347.95
Type I Ditch	400 LF (A)	7.38/LF	2,952.00
Type II Ditch	1015 LF (A)	6.44/LF	6,536.60
Seepage Collector	1 EA (A)	1,000.00 EA	1,000.00
Lime (20 Tons/Acre)	8.5 AC (A)	835.00/AC	7,097.50
On-Site Topsoil	9420 CY (A)	1.50/CY	14,130.00
Off-Site Topsoil	6160 CY (A)	3.24/CY	19,958.40
Revegetation with Mulch	13.5 AC (A)	667.00/AC	9,004.50
Revegetation with Erosion Control Blanket	2.44 AC (A)	6,020.41/AC	14,689.80
3-Wire Fence	6444 LF (A)	0.90/LF	5,799.60

TOTAL COST \$142,689.50

(A) Actual

(E) Estimate

NORTH SHAFT

Item	Quantity	Bid Price	Total Cost
Shaft Closure	1 EA (A)	\$1,000.00 EA	\$ 1,000.00
Bury Ruins	L.S.	800.00	800.00
Mine Waste Disposal	1480 CY (E)	1,200.00 LS	1,200.00
Lime (20 Tons/Acre)	1.4 AC (A)	835.00/AC	1,169.00
Topsoil	1240 CY (A)	4.00/CY	4,960.00
Revegetation	2.8 AC (A)	667.00/AC	1,867.60
3-Wire Fence	1235 LF (A)	0.90/LF	1,111.50

TOTAL COST \$ 12,108.10

(A) Actual

(E) Estimate

NORTH PIT

Item	Quantity	Bid Price	Total Cost
Regrade Mine Waste	550 CY (E)	\$1,500.00 LS	\$ 1,500.00
Lime (20 Tons/Acre)	0.3 AC (A)	835.00/AC	250.50
Topsoil	480 CY (A)	4.00/CY	1,920.00
Revegetation	0.4 AC (A)	667.00/AC	266.80
3-Wire Fence	679 LF (A)	0.90/LF	611.10

TOTAL COST \$ 4,548.40

(A) Actual

(E) Estimate

NORTHEAST SHAFT

Item	Quantity	Bid Price	Total Cost
Shaft Closure	1 EA (A)	\$1,000.00 EA	\$ 1,000.00
Bury Ruins	L.S.	1,600.00 LS	1,600.00
Debris Disposal	L.S.	800.00 LS	800.00
Mine Waste Disposal	3640 CY (E)	1,360.00 LS	1,360.00
Rip Rap	12 CY (A)	25.00/CY	300.00
Lime (20 Tons/Acre)	1.0 AC (A)	835.00/AC	835.00
Topsoil	1660 CY (A)	4.00/CY	6,640.00
Revegetation	1.0 AC (A)	667.00/AC	667.00
3-Wire Fence	970 LF (A)	0.90/LF	873.00

TOTAL COST \$14,075.00

(A) Actual

(E) Estimate

The cost of change orders was determined with negotiated costs, hourly equipment rates submitted with the bid proposal, and unit bid costs. Description and itemization of the change orders are given below.

Change Order No. 1

Install drain in adit, backfill adit, and revegetate at Northeast Shaft

Excavator 4 hours @ \$105 = \$420

Labor and materials = \$ 80

TOTAL COST CHANGE ORDER NO.1 \$ 500.00

Change Order No. 2

Backhoe was used to load mine waste into the scraper in areas of limited operating space at the Upper Bertha and Lower Bertha Mill Sites

Excavator 22 hours @ \$105 = \$2310.00

TOTAL COST CHANGE ORDER NO.2 \$ 2310.00

Change Order No. 3

Additional corner panels were installed beyond the quantity indicated on the drawings on the Upper Bertha Mill Site and Lower Bertha Mill Site fence

11 corner panels @ \$88 = \$968.00

TOTAL COST CHANGE ORDER NO.3 \$ 968.00

Change Order No. 4

Surplus seed to have on hand if reseeding is required
26 lbs @ \$4.25/lb = \$110.50

Install culvert at Corbin

Excavator	13.5 hours @ \$105 = \$1417.50
Scraper	6 hours @ \$150 = \$ 900.00
Blade	6 hours @ \$85 = \$ 510.00
DB Cat. Dozer	1 hour @ \$115 = \$ 115.00

TOTAL DUE CONTRACTOR UNDER CHANGE ORDER NO.4 \$ 3053.00

Additions and deductions to quantities of original unit price items were included in Change Order No. 4 to reconcile the final pay request.

TOTAL COST OF CONSTRUCTION CONTRACT \$180,252.00

IV. PROJECT SUMMARY AND COMMENT

The initial scope of work for this project included several mining disturbances located less than 250 yards south of the main Bertha Site. These sites are visible from the road and are continually eroding. However, these sites were removed from the project because the landowners refused to consent to reclamation. Glenore Mines and Robert Ebert initially refused reclamation but extensive negotiating convinced the landowners to allow reclamation. The reluctance by these landowners was attributed to the new Montana Tunnels Gold Mine located two miles south of the Bertha Site. The landowners did not want to decrease the value of their mining properties in case of future acquisition by Montana Tunnels. Reclamation, however, did not decrease property values.

The most significant problems during reclamation resulted from the 2:1 slopes required at the Upper Bertha Mill Site. Steep slopes were necessary in order to maximize the flat area adjacent to the collapsed shaft which was a landowner requirement. Equipment operation was difficult on the slopes and topsoil placement was very troublesome. The contour ditches added to the problem as they were ultimately constructed twice. Terraces instead of contour ditches would most likely have facilitated reclamation. Terraces would serve the same purpose as contour ditches but would decrease the available area at the top of the slope.

Erosion control mat (curlex blanket) was placed on the steep 2:1 slopes instead of the standard hay mulch. This is more costly mulch but very effective on steep slopes. The erosion control mat proved effective even before the project was complete. An intense rainstorm hit the area soon after the mat was placed. No erosion

damage or uplifting of the mat occurred as a result of the rainstorm. More staples were placed than generally recommended by the manufacturer which helped to secure the mat.

A chain link fence with three strands of barbed wire was installed around the two shaft covers at the Upper Bertha Mill Site. These fences provided added protection but they did not blend in with the natural setting. The concrete shaft covers essentially eliminated the safety hazard, therefore, a lower profile wooden fence may have been more appropriate to fit in with the area. The chain link fence could have been painted green or green slats installed.

Wayne Allen, d.b.a. Mountain Construction, was the contractor on this project and was a "hands-on" equipment operator. Mr. Allen has to be credited with much of the success of this project. He was extremely conscientious in completing a good job and was very careful to avoid surface damage to adjacent areas whenever possible.

The completed project looked very good and will greatly improve as vegetation becomes established. Several local residents visited the site and complimented the inspector and contractor on the vast improvement of the site appearance. Other reclamation objectives, besides aesthetics, were also achieved by the project. The tailings are protected from further erosion and the safety hazards have been removed.

APPENDIX

Analysis of Consultant Costs

As-Built Construction Drawings

Sheet 1 of 4

Sheet 2 of 4

Sheet 3 of 4

Sheet 4 of 4

Photo Documentation of Project
(Included with one report only)

ANALYSIS OF CONSULTANT COSTS

PROJECT NAME: Bertha Mill Site
PROJECT NO.: MONT A/E 87-46-108
DATE PREPARED: July 1988

<u>SERVICE</u>	<u>AMOUNT</u>
ENGINEERING DESIGN 1987	\$ 18,674.00
 SUBTOTAL ENGINEERING DESIGN:	 \$ 18,674.00
 CONSTRUCTION INSPECTION AND ADMINISTRATION 1988	 \$ 27,028.00
 SUBTOTAL CONSTRUCTION INSP. & ADMIN.:	 \$ 27,028.00
TOTAL PROJECT ENGINEERING COST:	\$ 45,702.00
TOTAL CONSTRUCTION COST:	\$180,252.00

COST COMPARISON - PROJECT ENGINEERING/CONSTRUCTION

ENGINEERING DESIGN/CONSTRUCTION	10.3%
CONSTRUCTION INSP. & ADMIN./CONSTRUCTION	15%
TOTAL PROJECT ENGINEERING/CONSTRUCTION	25%

BERTHA MILL SITE MINE RECLAMATION CONSTRUCTION PLANS JEFFERSON COUNTY, MONTANA



VICINITY MAP

INDEX

NO.	SITE
1	COVER SHEET, VICINITY MAP, QUANTITY SUMMARY
2	UPPER BERTHA MILL SITE
3	LOWER BERTHA MILL SITE
4	NORTH SHAFT, NORTH PIT, NORTHEAST SHAFT

prepared for:

MONTANA DEPT. OF STATE LANDS
ABANDONED MINE RECLAMATION BUREAU

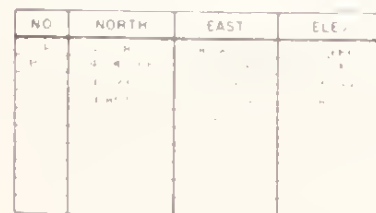
designed by:

DELTA ENGINEERING P.C.
GREAT FALLS, MONTANA

PH. 727-3687

AS-BUILT

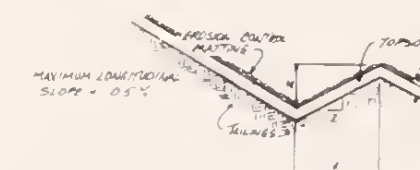
MONT. A/E : 87-46-108



NOTE ANY LIVE TREES THAT ARE NOT
ABSOLUTELY NECESSARY TO REMOVE
SHALL BE PRESERVED BY
CONTRACTOR

BACKFILL ADIT

CONSTRUCT 3200 LF OF 3-WIRE FENCE
AND 1-6 GATE AS SHOWN



CONTOUR DITCH DETAIL
SCALE 1" = 1'

AS-BUILT

STATE OF MONTANA
DEPT OF STATE LANDS
RECLAMATION DIVISION
UPPER BERTHA MILL SITE
SE 1/4, SECTION 3 T27N R4W
JEFFERSON COUNTY MONTANA

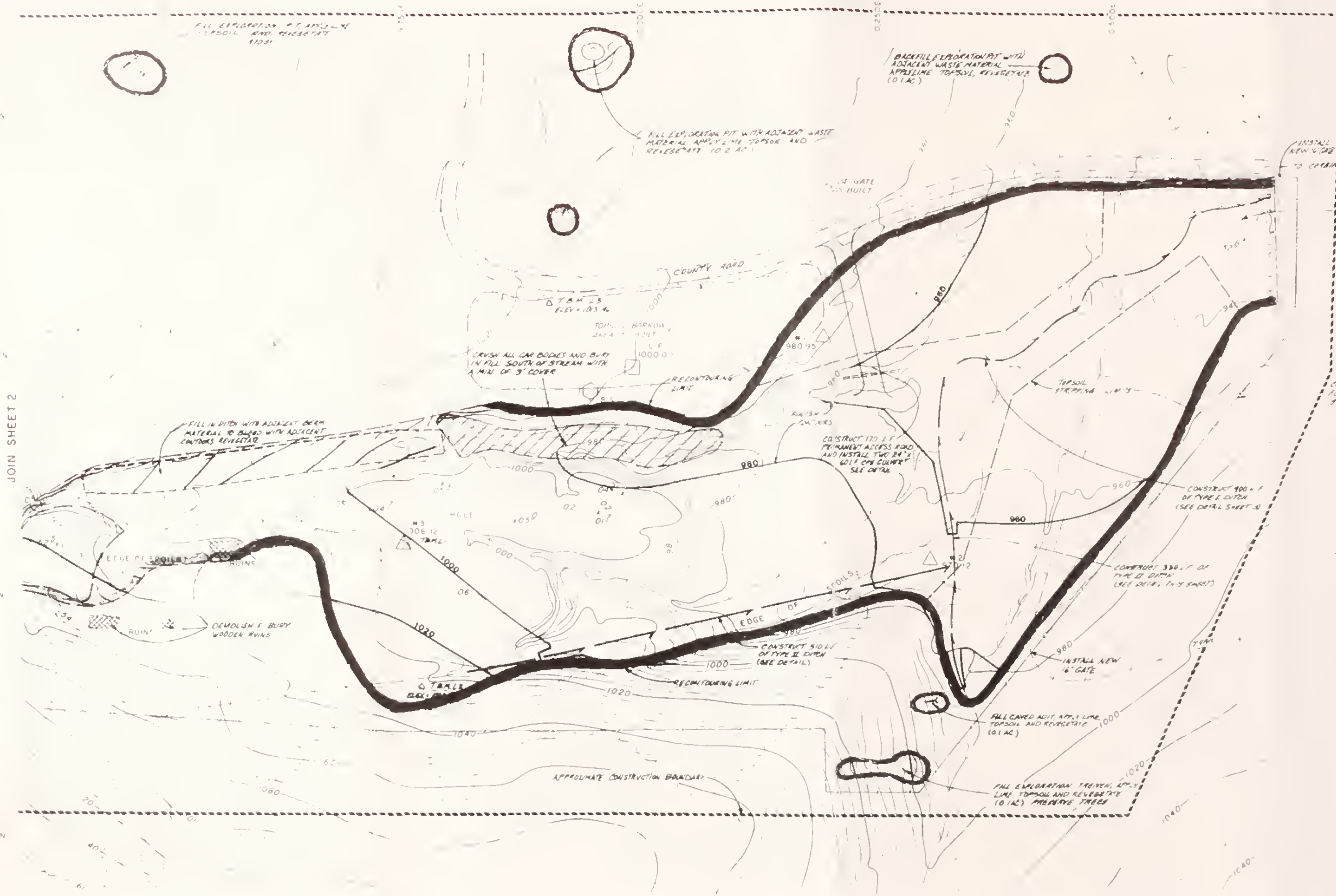
ORGANIZED BY Prof. Dr. A. S. S. S. S.
 DATE 2.2.2024
 CHECKED BY 2.2.2024

FOR NO	FILE NO	Sheet 2 of 2
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LANDOWNERS

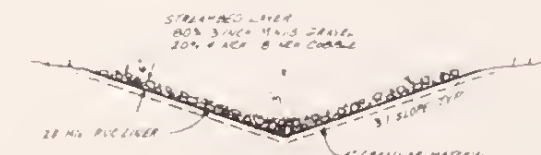
Mr. & Mrs. Robert C. Eberl
112 Ridgeway Lane
Helena, MT 59601
Phone 442-5027

Glenns Mine
c/o Mr. Richard Peters
807 N. University
Spokane, WA 99209
Phone 15091924-9093

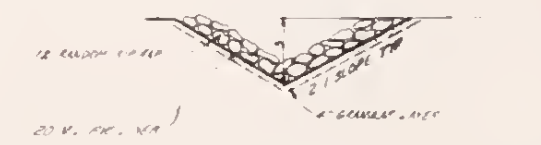


REGRADING TAILINGS IN PLACE TO FORM FINISH CONTOURS WITHIN RECONTOURING LIMITS AS SHOWN. APPROXIMATELY 1,000 CUBIC YARDS OF TAILINGS SHALL BE EXCAVATED AND HAULED FROM THE LOWER BERtha MILL SITE TO THE UPPER SITE. APPLY LIME AT 100 LBS PER 100 YD² IN ALL AREAS OF TAILINGS. AND COVER WITH 8 INCHES OF TOPSOIL. DISTURBED ALL TOPSOILED AND DISTURBED AREAS AND TOPSOIL EXPOSED AREAS WITHIN RECONTOURING LIMITS.

CONSTRUCT 1031 LF OF 3-MILE FENCE AND 3-16" GATES AS SHOWN



TYPE I DITCH
SCALE 1" = 10'



TYPE II DITCH
SCALE 1" = 10'

AS-BUILT

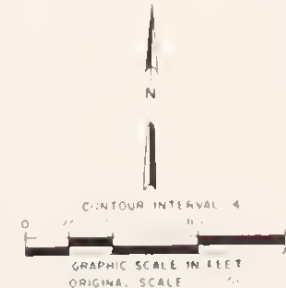
STATE OF MONTANA
DEPT. OF STATE LANDS
RECLAMATION DIVISION

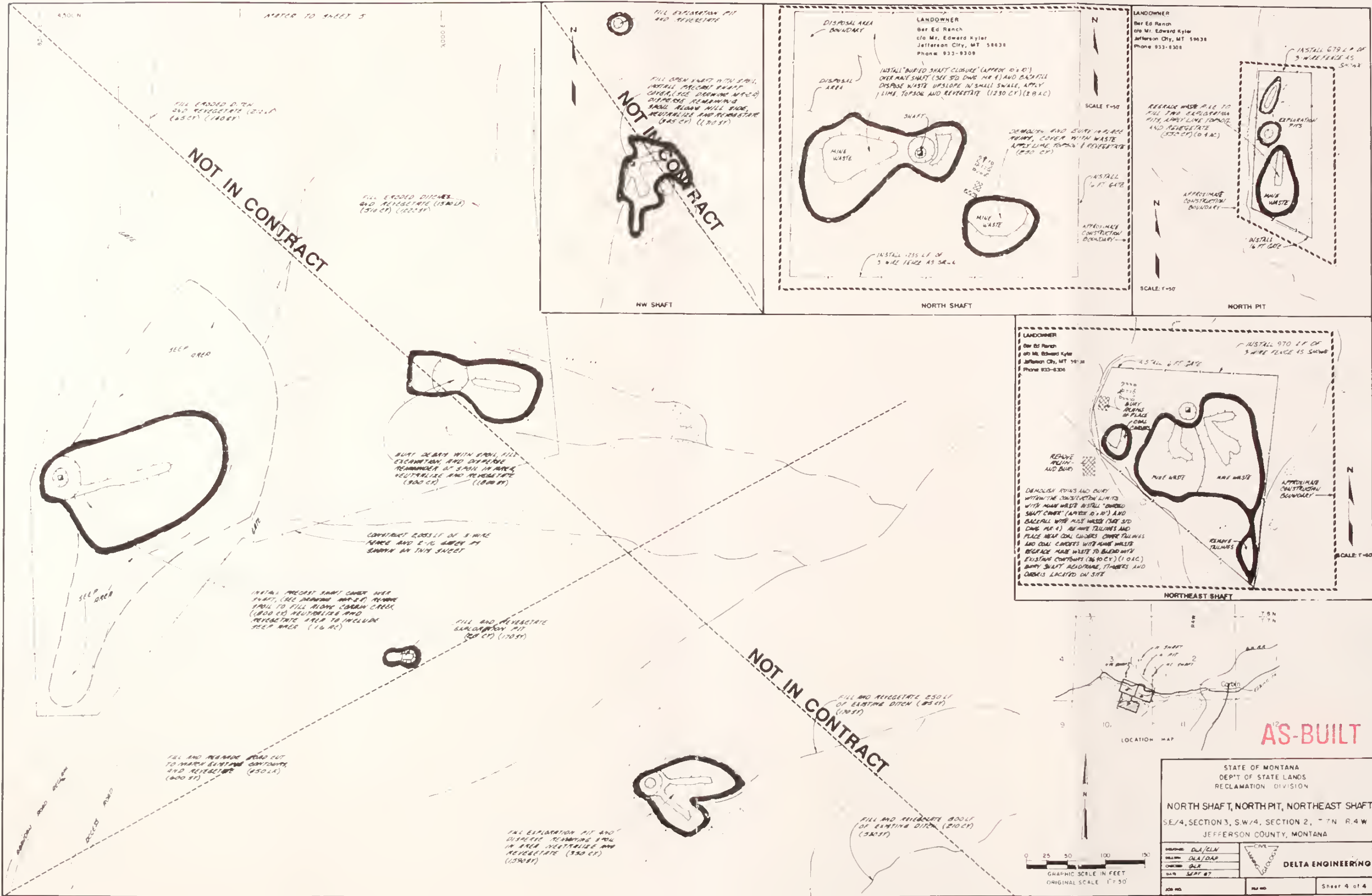
OWER BERTHA MILL SITE
SW 1/4, SECTION 2, SECTION 3, T 7 N, R 4 W
JEFFERSON COUNTY MONTANA

DESIGNED: DLA/CLN		DELTA ENGINEERING
DRAWN: DLA/DAP		
CHECKED: BLN		
DATE: SEPT 87		
PLS NO.	PLS NO.	Sheet 3 of 4

NO	NORTH	EAST	ELEV
1	1000	1000	1000
2	1000	1000	1000
3	1000	1000	1000
4	1000	1000	1000

- PAVED ROAD
- IMPROVED ROAD
- BRIDGE
- WATER TOWER
- POWER
- FENCE
- FINISH CONTOUR
- DITCH
- APPROX CONSTRUCTION BOUNDARY
- TREES
- DRAINAGE
- WIND
- SWAMP
- INTERIOR CONTOUR
- INTERMEDIATE CONTOUR
- DEPRESSION CONTOUR
- BUILDING
- RECONTOURING LIMIT





FILL EXPOSED DITCH AND REVEGETATE (250 LF) (120 SF)

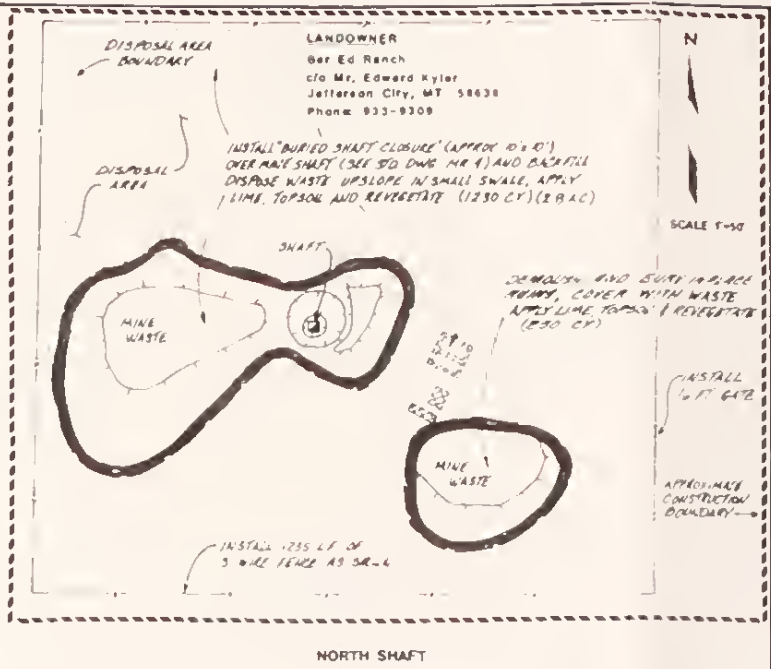
NOT IN CONTRACT

FILL EXPOSED DITCHES AND REVEGETATE (150 LF) (50 SF)

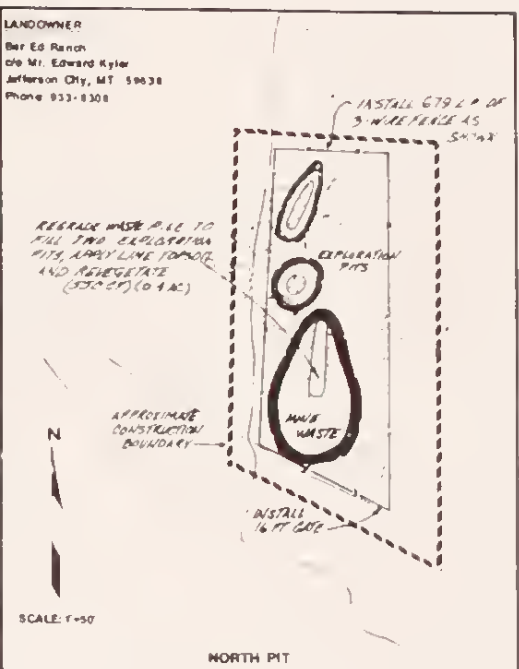
NOT IN CONTRACT

FILL OPEN SHAFT WITH SOIL, INSTALL PRECAST SHAFT CLOSURE (SEE DRAWING M-20) DISPOSE REMAINING SOIL ALONG HILL SIDE, NEUTRALIZE AND REVEGETATE (845 CF) (120 SF)

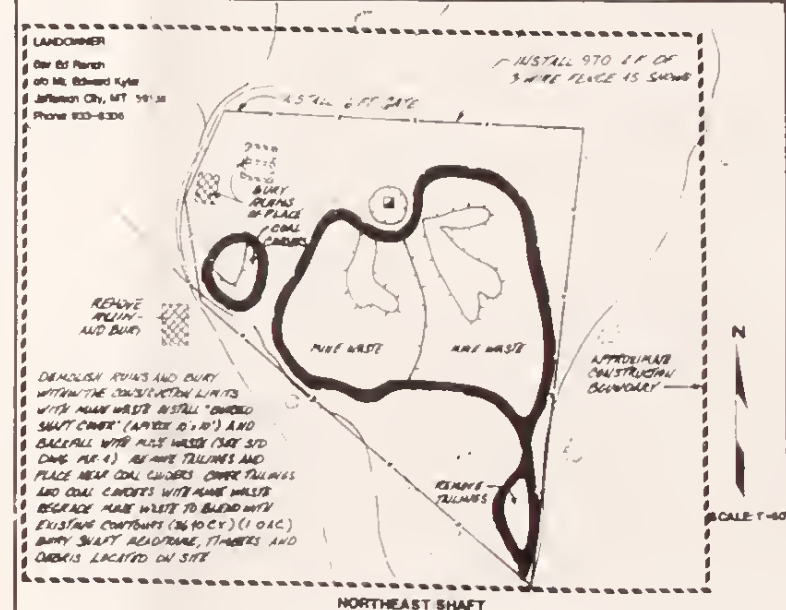
NW SHAFT



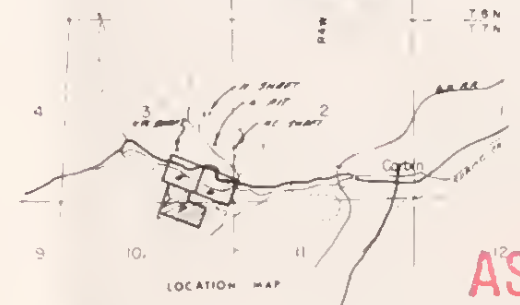
NORTH SHAFT



NORTH PIT




NORTHEAST SHAFT



LOCATION MAP

AS-BUILT

STATE OF MONTANA DEPT OF STATE LANDS RECLAMATION DIVISION	
NORTH SHAFT, NORTH PIT, NORTHEAST SHAFT SE 1/4, SECTION 3, S.W. 1/4, SECTION 2, T. 7N. R. 4W JEFFERSON COUNTY, MONTANA	
DESIGNED: DLA/CLN	
DRAWN: DLA/DAP	
CHECKED: DLR	
DATE: SEPT 87	
JOB NO.	REV NO.
SHEET 4 OF 4	

